MODEL

- BOSS ARC 140VRD
- BOSS ARC 160VRD

Operating Manual
(Owner's Manual)

IMPORTANT: Read these instructions before installing, operating, or servicing this system.

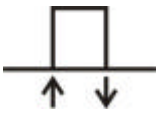
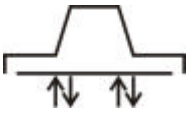
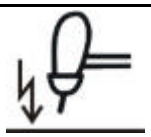
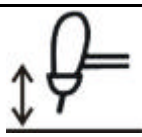
First Edition
September, 2008

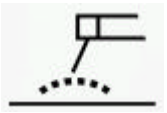
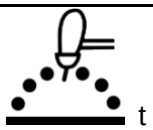
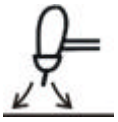
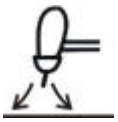
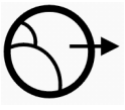
Manual No. B0803

CONTENTS

SYMBOL LEGEND----2
STATEMENT OF WARRANTY----3
1.0 GENERAL INFORMATION----4
1.01 Notes, Cautions and Warnings----4
1.02 Important Safety Precautions----4
1.03 Transporting methods----6
2.0 INSTALLATION RECOMMENDATION----7
2.01 Electrical Input Connections----8
2.02 Specifications----9
2.03 Duty cycle----9
3.0 OPERATOR CONTROLS----10
3.01 BOSS ARC VRD Series controls----10
3.02 Weld parameter description----11
4.0 SET-UP FOR MMA (STICK) AND GTAW (TIG)----12
4.01 Stick welding----13
4.02 DC TIG welding----13
5.0 POWER SUPPLY CONTROLS INDICATORS AND REATURES----14
6.0 BASIC TIG WELDING GUIDE----15
6.01 Electrode Polarity----15
6.02 Tungsten Electrode Current Ranges----15
6.03 Tungsten Electrode Types----15
6.04 Guide for Selecting Filler Wire Diameter----15
6.05 Shielding gas selection----16
6.06 TIG welding parameters for low carbon & low alloy steel pipe----16
6.07 Welding parameters for steel----16
7.0 BASIC ARC WELDING GUIDE----17
7.01 Electrode polarity----17
7.02 Effects of stick welding various materials----17
8.0 MAINTENANCE----18
9.0 BASIC TROUBLESHOOTING----19
9.01 Check the item and excrescent phenomenon exclusion method----19
9.02 TIG welding problems----20
9.03 Stick welding problems----21
9.04 Power source problems----22
10.0 PART LIST----23
11.0 REMARK----27

SYMBOL LEGEND

A	Amperage
V	Voltage
Hz	Hertz (frequency)
SEC	Seconds
%	Percent
⎓	DC (Direct Current)
∿	AC (Alternating Current)
	2T (GTAW)
	4T (GTAW)
	Repeat Function (GTAW)
	Spot Function (GTAW)
	High Frequency Starting (GTAW)
	Lift Start （GTAW）

	Stick (SMAW)
	Pulse Current Function (GTAW)
 t	Spot Time (GTAW)
	Remote outputs control (Panel/Remote)
	Remote Function
	Arc Control (SMAW)
 t_2	Gas Post-Flow Time
 t_1	Gas Pre-Flow Time
VRD	Voltage Reduction Device Circuit
—	Negative
+	Positive
	Gas Input
	Gas Output

STATEMENT OF WARRANTY

LIMITED WARRANTY: "BOSS" warrants to customers of its authorized distributors hereafter "BOSS" that its products will be free of defects in workmanship or material. Should any failure to conform to this warranty appear within the time period applicable to the BOSS products as stated below, BOSS shall, upon notification thereof and substantiation that the product has been stored, installed, operated, and maintained in accordance with BOSS's specifications, instructions, recommendations and recognized standard industry practice, and not subject to misuse, repair, neglect, alteration, or accident, correct such defects by suitable repair or replacement, at BOSS 's sole option, of any components or parts of the product determined by BOSS to be defective.

The BOSS COMPANY MAKES NO OTHER WARRANTY, EXPRESS OR IMPLIED. THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHERS, INCLUDING, BUT NOT LIMITED TO ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

LIMITATION OF LIABILITY: BOSS shall not under any circumstances be liable for special, indirect or consequential damages, such as, but not limited to, lost profits and business interruption. The remedies of the Purchaser set forth herein are exclusive and the liability of BOSS with respect to any contract, or anything done in connection therewith such as the performance or breach thereof, or from the manufacture, sale, delivery, resale, or use of any goods covered by or furnished by BOSS whether arising out of contract, negligence, strict tort, or under any warranty, or otherwise, shall not, except as expressly provided herein, exceed the price of the goods upon which such liability is based. No employee, agent, or representative of BOSS is authorized to change this warranty in any way or grant any other warranty.

PURCHASER'S RIGHTS UNDER THIS WARRANTY ARE VOID IF REPLACEMENT PARTS OR ACCESSORIES ARE USED WHICH IN BOSS'S SOLE JUDGEMENT MAY IMPAIR THE SAFETY OR PERFORMANCE OF ANY BOSS PRODUCT. PURCHASER'S RIGHTS UNDER THIS WARRANTY ARE VOID IF THE PRODUCT IS SOLD TO PURCHASER BY NON-AUTHORIZED PERSONS.

The warranty is effective for the time stated below beginning on the date that the authorized distributor delivers the products to the Purchaser. Not with standing the foregoing, in no event shall the warranty period extend more than the time stated plus one year from the date BOSS delivered the product to the authorized distributor.

POWER SUPPLIES	**POWER SUPPLIES & WIRE FEEDERS**
MAIN POWER MAGNETICS (STATIC& ROTATING)	1YEAR
ORIGINAL MAIN POWER RECTIFIER	1YEAR
POWER SWITCHING SEMI-CONDUCTORS & CONTROL PC BOARD	1YEAR
ALL OTHER CIRCUITS AND COMPONENTS INCLUDING BUT NOT LIMITED TO, CONTACTORS, RELAYS, SOLENOIDS, PUMPS, SWITCHES, MOTORS	1YEAR

Warranty repairs or replacement claims under this limited warranty must be submitted to BOSS by an authorized BOSS repair facility within thirty (30) days of purchaser's notice of any Warranty Claim. No transportation costs of any kind will be paid under this warranty. Transportation charges to send products to an authorized warranty repair facility shall be the responsibility of the Purchaser. All returned goods shall be at the Purchaser's risk and expense. This warranty supersedes all previous BOSS warranties.

1.0 GENERAL INFORMATION

1.01 Notes, Cautions and Warnings

Throughout this manual, notes, cautions, and warnings are used to highlight important information. These highlights are categorized as follows:

NOTE

An operation, procedure, or background information which requires additional emphasis or is helpful in efficient operation of the system.

CAUTION

A procedure which, if not properly followed, may cause damage to the equipment.

WARNING

A procedure which, if not properly followed, may cause injury to the operator or others in the operating area.

1.02 Important Safety Precautions

WARNING

OPERATION AND MAINTENANCE OF ARC WELDING EQUIPMENT CAN BE DANGEROUS AND HAZARDOUS TO YOUR HEALTH.

To prevent possible injury, read, understand and follow all warnings, safety precautions and instructions before using the equipment. Call your local distributor if you have any questions.

GASES AND FUMES

Gases and fumes produced during the Arc welding or cutting process can be dangerous and hazardous to your health.

- Keep all fumes and gases from the breathing area. Keep your head out of the welding fume plume.
- Use an air-supplied respirator if ventilation is not adequate to remove all fumes and gases.
- The kinds of fumes and gases from the arc welding/cutting depend on the kind of metal being used, coatings on the metal, and the different processes. You must be very careful when cutting or welding any metals which may contain one or more of the following:
  Antimony Arsenic Barium Beryllium Cadmium Chromium Cobalt Copper Lead Manganese Mercury Nickel Selenium Silver Vanadium
- Always read the Material Safety Data Sheets (MSDS) that should be supplied with the material you are using. These MSDSs will give you the information regarding the kind and amount of fumes and gases that may be dangerous to your health.
- Use special equipment, such as water or down draft welding/cutting tables, to capture fumes and gases.
- Do not use the welding torch in an area where combustible or explosive gases or materials are located.
- Phosgene, a toxic gas, is generated from the vapors of chlorinated solvents and cleansers. Remove all sources of these vapors.

ELECTRIC SHOCK

Electric Shock can injure or kill. The arc welding process uses and produces high voltage electrical energy. This electric energy can cause severe or fatal shock to the operator or others in the workplace.

- Never touch any parts that are electrically “live” or “hot.”
- Wear dry gloves and clothing. Insulate yourself from the work piece or other parts of the welding circuit.
- Repair or replace all worn or damaged parts.
- Extra care must be taken when the workplace is moist or damp.
- Install and maintain equipment according to NEC code, refer to relative standards
- Disconnect power source before performing any service or repairs.
- Read and follow all the instructions in the Operating Manual.

FIRE AND EXPLOSION

Fire and explosion can be caused by hot slag, sparks, or the arc weld.

- Be sure there is no combustible or flammable material in the workplace. Any material that cannot be removed must be protected.
- Ventilate all flammable or explosive vapors from the workplace.
- Do not cut or weld on containers that may have held combustibles.
- Provide a fire watch when working in an area where fire hazards may exist.
- Hydrogen gas may be formed and trapped under aluminum workpieces when they are cut underwater, or while using a water table. Do not cut aluminum alloys underwater or on a water table unless the hydrogen gas can be eliminated or dissipated. Trapped hydrogen gas that is ignited will cause an explosion.

NOISE

Noise can cause permanent hearing loss. Arc welding/cutting processes can cause noise levels to exceed safe limits. You must protect your ears from loud noise to prevent permanent loss of hearing.

- To protect your hearing from loud noise, wear protective ear plugs and/ or ear muffs. Protect others in the workplace.
- Noise levels should be measured to be sure the decibels (sound) do not exceed safe levels.

ARC WELDING RAYS

Arc Welding/ Cutting Rays can injure your eyes and burn your skin. The arc welding/cutting process produces very bright ultra violet and infra red light. These arc rays will damage your eyes and burn your skin if you are not properly protected.

- To protect your eyes, always wear a welding helmet or shield. Also always wear safety glasses with side shields, goggles or other protective eye wear.
- Wear welding gloves and suitable clothing to protect your skin from the arc rays and sparks.
- Keep helmet and safety glasses in good condition. Replace lenses when cracked, chipped or dirty.
- Protect others in the work area from the arc rays. Use protective booths, screens or shields.

1.03 Transporting methods

These units are equipped with a handle for carrying purposes.

WARNING: ELECTRIC SHOCK can kill.

DO NOT TOUCH live electrical parts. Disconnect input power conductors from de-energized supply line before moving the welding power source.

WARNING: FALLING EQUIPMENT can cause serious personal injury and equipment damage.

- Lift unit with handle on top of case.
- Use handcart or similar device of adequate capacity.
- If using a fork lift vehicle, place and secure unit on a proper skid before transporting.

2.0 INSTALLATION RECOMMENDATION

Installation Environment

BOSS ARC VRD Series is designed for use in hazardous environments.

Examples of environments with increased hazardous environments are -

In locations in which freedom of movement is restricted, so that the operator is forced to perform the work in a cramped (kneeling, sitting or lying) position with physical contact with conductive parts; In locations which are fully or partially limited by conductive elements, and in which there is a high risk of unavoidable or accidental contact by the operator, or in wet or damp hot locations where humidity or perspiration considerable reduces the skin resistance of the human body and the insulation properties of accessories.

Environments with hazardous environments do not include places where electrically conductive parts in the near vicinity of the operator, which can cause increased hazard, have been insulated.

Installation Location

Be sure to locate the welder according to the following guidelines:

- In areas, free from moisture and dust.
- In areas, free from oil, steam and corrosive gases.
- In areas, not exposed to direct sunlight or rain.
- Ambient temperature: between -10 degrees C to 40 degrees C.
- In areas, not subjected to abnormal vibration or shock.
- Place at a distance of 304.79mm or more from walls or similar that could restrict natural airflow for cooling.

WARNING 1

BOSS advises that this equipment be electrically connected by a qualified electrician.

The following Primary Current recommendations are required to obtain the maximum welding current and duty cycle from this Power Supply:

Model	Primary supply lead size	Minimum primary current circuit size		Current & Duty Cycle	
		TIG	STICK	TIG	STICK
BOSS ARC 140VRD	Minimum $5mm^2$	220V/19.5A 240V/17.9A	220V/27A 240V/24.8A	140A/15.6V@60% 125A/15V@100%	140A/25.6V@60% 110A/24.4V@100%
BOSS ARC 160VRD	Minimum $6mm^2$	220V/22A 240V/20.2A	220V/33.5A 240V/30.7A	160A/16.4V@100%	160A/26.4V@60% 125A/25V@100%

Table 1 Primary current circuit sizes to achieve maximum current

2.01 Electrical Input Connections

> **WARNING:** ELECTRIC SHOCK can kill; SIGNIFICANT DC VOLTAGE is present after removal of input power.

DO NOT TOUCH live electrical parts

SHUT DOWN welding power source, disconnect input power employing lockout/ tagging procedures. Lockout/ tagging procedures consist of padlocking line disconnect switch in open position, removing fuses from fuse box, or shutting off and red-tagging circuit breaker or other disconnecting device.

Electrical Input Requirements

Operate the welding power source from a single phase 50/ 60 Hz, AC power supply. The input voltage must match one of the electrical input voltages shown on the input data label on the unit nameplate. Contact the local electric utility for information about the type of electrical service available, how proper connections should be made, and inspection required.

The line disconnect switch provides a safe and convenient means to completely remove all electrical power from the welding power supply whenever necessary to inspect or service the unit.

According to Table 1 and below as a guide to select line fuses for the disconnect switch.

Input Voltage	Fuse Size
220/240V AC	50 Amps

Table 2

Notice: Fuse size is based on not more than 200 percent of the rated input amperage of the welding power source (Based on Article 630, National Electrical Code).

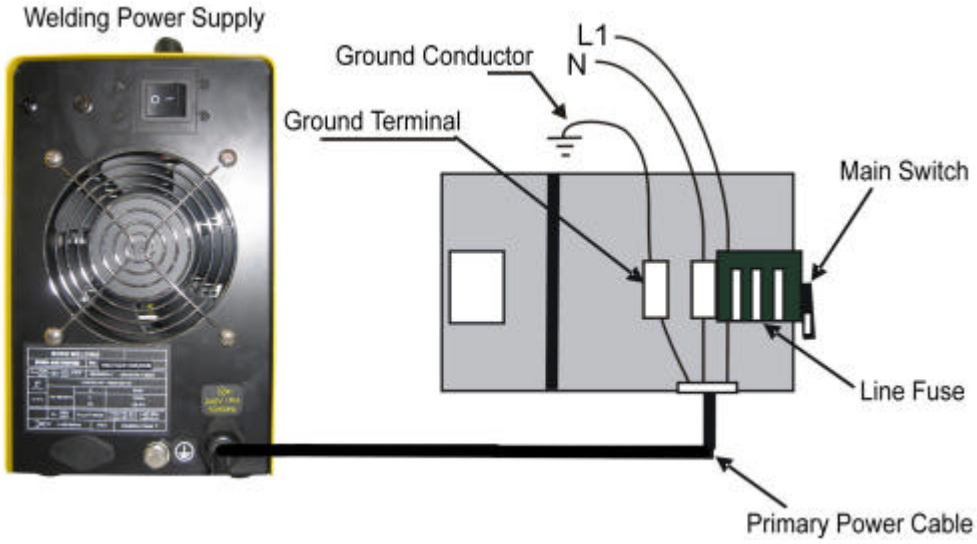


Figure 1 Electrical input connections

2.02 Specifications

MODEL		BOSS ARC 140VRD	BOSS ARC 160VRD
Input voltage and frequency and phases		220/240V 50/60Hz 1ph	220/240V 50/60Hz 1ph
KVA @ max output	TIG	4.3KVA	4.8KVA
	STICK	6.0KVA	7.4kVA
Max current		140A	160A
Output current range		10~140A	10~160A
Open circuit voltage		56/61V	56/61V
Duty cycle at 40℃		60%	60%
Weight		9.5kg	12kg
Dimensions (mm)		370×150×245	420×160×265

Table 3

2.03 Duty cycle

The duty cycle of a welding power source is the percentage of a ten (10) minute period that it can be operated at a given output without causing overheating and damage to the unit. If the welding amperes decrease, the duty cycle increases. If the welding amperes are increased beyond the rated output, the duty cycle will decrease.

WARNING: Exceeding the duty cycle ratings will cause the thermal overload protection circuit to become energized and shut down the output until has cooled to normal operating temperature

Continually exceeding the duty cycle ratings can cause damage to the welding power source.

NOTICE：

Due to variations that can occur in manufacture products, claimed performance, voltages, ratings, all capacities, measurements, dimensions and weights quoted are approximate only. Achievable capacities and ratings in use and operation will depend upon correct installation, use, applications, maintenance and service.

3.0 OPERATOR CONTROLS

3.01 BOSS ARC VRD Series Controls

Figure 2

1. Welding Current Control——Used for regulating to welding current.
2. Warning Indicator
3. AC Power Indicator
4. Main Power Switch
5. Positive (+) Socket——TIG connect the work lead/ MMA connect the electrode holder.
6. Negative (-) Socket——TIG connect the TIG torch/ MMA connect the work lead.
7. Input Power Cable
8. Ground Screw
9. VRD Indicator

WARNING

When the welder is connected to the primary supply voltage, the internal electrical components maybe at primary potential with respect to earth.

3.02 Weld parameters description

Figure 3 BOSS ARC VRD Series front panel with parameter description

Parameter	Description
Welding Current	This parameter sets the welding current.

Table 4 Weld parameter description for BOSS ARC VRD Series

4.0 SET-UP FOR MMA (STICK) AND GTAW (TIG)

Conventional operating procedures apply when using the welding power source, i.e. connect work lead directly to work piece and welding cable is used to electrode holder. Wide safety margins provided by the coil design ensure that the welding power source will withstand short-term overload without adverse effects. The welding current range values should be used as a guide only. Current delivered to the arc is dependent on the welding arc voltage, and as welding arc voltage varies between different classes of electrodes, welding current at any one setting would vary according to the type of electrode in use. The operator should use the welding current range values as a guide, and then finally adjust the current setting to suit the application.

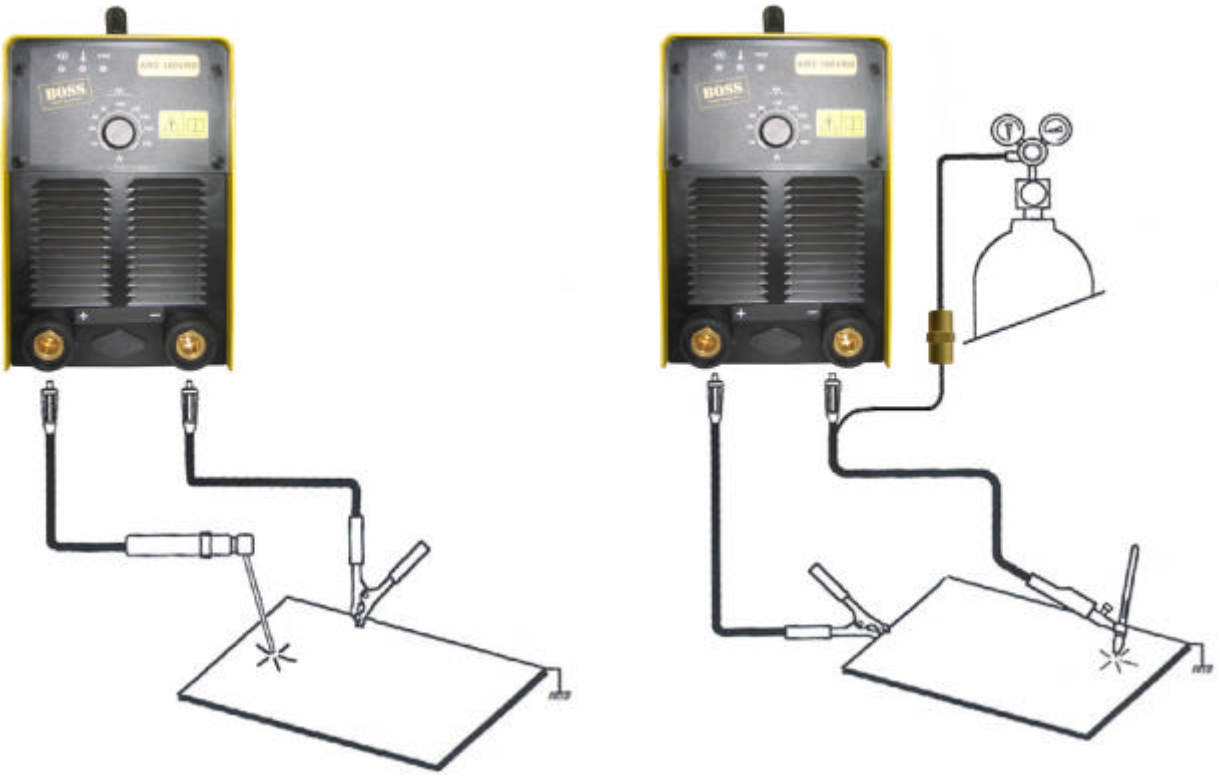


Figure 4 Set up for BOSS ARC VRD Series

WARNING:

Before connecting the work clamp to the work and inserting the electrode in the electrode holder make sure the Primary power supply is switched off.

CAUTION 2:

Remove any packaging material prior to use. Do not block the air vents at the front or rear of the Welding Power Source.

4.01 Stick welding

- Connect work lead to negative terminal.
- Connect electrode lead to positive terminal.
- Switch machine on.
- Set welding current control (see table 5).

Workpiece thickness mm	0.5-2.0	2.0-5.0	5.0-7.0	
Electrode diameter mm	1.0-2.0	2.0-3.2	3.2-4.0	
Welding current（A）	10-50	50-150	150-250	

Table 5

4.02 DC TIG welding

- Connect work lead to positive terminal.
- Connect TIG torch to negative terminal.
- Switch machine on.
- Set welding current control (see table 6).
- Use TIG torch with value control.

Workpiece thickness (mm)	Tungsten diameter (mm)	Welding current (A)	Filler wire diameter (mm)	Argon Gas flow (L/min)
0.3-0.5	1-1.6	5-30		3-8
0.5-1.2	1.6-2	10-50	1.2-1.6	4-8
1.2-2	1.6-2	10-50	1.2-1.6	4-8
1.2-2	1.6-2	30-70	1.6-2.0	6-9
2-4	2-4	60-100	1.6-2.0	7-10
4-6	3-4	100-200	2.0-2.5	1-15

Table 6

5.0 POWER SUPPLY CONTROLS INDICATORS AND REATURES

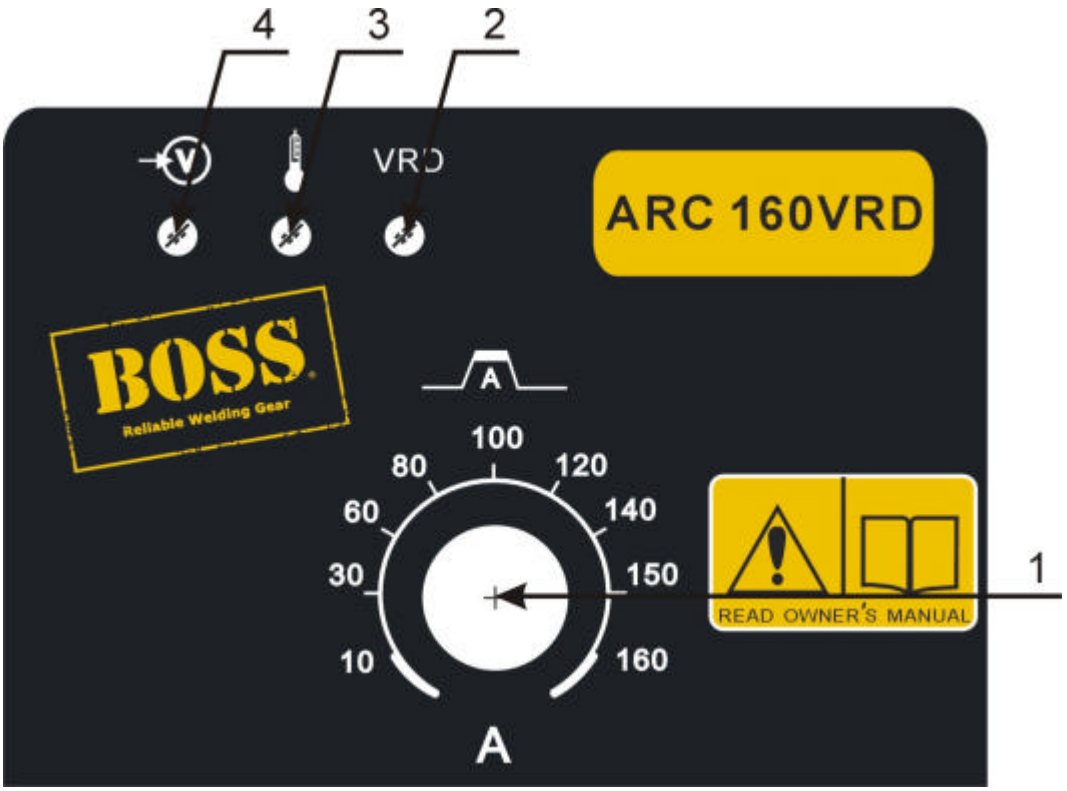


Figure 5 BOSS ARC VRD Series front panel

1. Welding currents control——Uses in adjusting the welding current.
2. VRD indicator.
3. Warning indicator——Red colored light instruction welding machine overload.
4. AC power indicator——Green colored light instruction power source is normal.

6.0 BASIC TIG WELDING GUIDE

6.01 Electrode Polarity

Connect the TIG torch to the - / torch terminal and the work lead to the + / work terminal for direct current straight polarity. Direct current straight polarity is the most widely used polarity for DC TIG welding. It allows limited wear of the electrode since 70% of the heat is concentrated at the work piece.

6.02 Tungsten Electrode Current Ranges

Electrode Diameter (mm)	DC current (A)
1.0	30—60
1.6	60—115
2.4	100—165
3.2	135—200
4.0	190—280
4.8	250—340

Table 7 Current ranges for varies tungsten electrode sizes

6.03 Tungsten Electrode Types

Tungsten type (Ground finish)	Welding Application	Features	Color code
Thoriated 2%	DC welding of mild steel, stainless steel and copper	Excellent arc starting, Long life, high current carrying capacity	Red
Ceriated 2%	DC welding of mild steel, stainless steel, copper, aluminium, magnesium and their alloys	Longer Life, More stable arc, Easier starting, Wider current range, Narrower more concentrated arc	Grey

Table 8 Tungsten electrode types

6.04 Guide for Selecting Filler Wire Diameter

Filler wire diameter	DC current range (Amps)
1.6	20—90
2.4	65—115
3.2	100—165
4.8	200—350

Table 9 Filler wire selection guide

Notice：

The filler wire diameter specified in Table 9 is a guide only, other diameter wires may be used according to the welding application.

6.05 Shielding gas selection

Alloy	Shielding gas
Aluminium & alloys	Argon
Carbon steel	Argon
Stainless steel	Argon
Nickel alloy	Argon
Copper	Argon
Titanium	Argon

Table 10 Shield gas selection

6.06 TIG welding parameters for low carbon & low alloy steel pipe

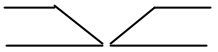
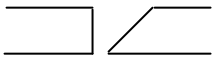
Tungsten type & diameter	Current range DC (Amperes)	Filler rod for root pass	Joint preparation
Thoriated 2% 3/32" (2.4mm)	120—170	Yes	
Thoriated 2% 3/32" (2.4mm)	100—160	Yes	
Thoriated 2% 3/32" (2.4mm)	90—130	No	

Table 11 TIG welding parameters for low carbon & low alloy steel pipe

6.07 Welding parameters for steel

Base metal thickness (mm)	DC current for mild steel (A)	DC current for stainless steel (A)	Tungsten diameter (mm)	Filler rod diameter (if require) (mm)	Argon gas flow rate (litres/min)	Joint type
1.0	35—45 40—50	20—30 25—35	1.0	1.6	5—7	butt/ corner lap/ fillet
1.2	45—55 50—60	30—45 35—50	1.0	1.6	5—7	butt/ corner lap/ fillet
1.6	60—70 70—90	40—60 50—70	1.6	1.6	7	butt/ corner lap/ fillet
3.2	80—100 90—115	65—85 90—110	1.6	2.4	7	butt/ corner lap/ fillet
4.8	115—135 140—165	100—125 125—150	2.4	3.2	10	butt/ corner lap/ fillet
6.4	160—175 170—200	135—160 160—180	3.2	4.0	10	butt/ corner lap/ fillet

Table 12 DC TIG welding parameters

7.0 BASIC ARC WELDING GUIDE

7.01 Electrode polarity

Stick electrodes are generally connected to the "+" terminal and the work lend to the "-" terminal but if in doubt consult the electrode manufacturers literature.

7.02 Effects of stick welding various materials

High tensile and alloy steels

The two most prominent effects of welding these steels are the formation of a hardened zone in the weld area, if suitable precautions are not taken, the occurrence in this zone of under-bead cracks. Hardened zone and under-bead cracks in the weld area may be reduced by using the correct electrodes, preheating, using higher current settings, using larger electrodes size, short runs for larger electrode deposits or tempering in a furnace.

Manganese steels

The effect on manganese steel slow of cooling from high temperature is to embrittle it. For this reason it is absolutely essential to keep manganese steel cool during welding by quenching after each weld or skip welding to distribute the heat.

Cast iron

Most types of cast iron, expect white iron, are weldable. White iron, because of its extreme brittleness, generally cracks when attempts are made to weld it. Trouble may also be experienced when welding white-heart malleable, due to the porosity caused by gas held in this type of iron.

Copper and alloys

The most important factor is the high rate of heat conductivity of copper, so making preheating of heavy sections necessary to give proper fusion of weld and base metal.

Types of Electrodes

Arc welding electrodes are classified into a number of groups depending on their applications. There are a great number of electrodes used for specialized industrial purposes, which are not of particular interest for everyday general work. These include some low hydrogen types for high tensile steel, cellulose types for welding large diameter pipes, etc. The range of electrodes dealt with in this publication will cover the vast majority of applications likely to be encountered; are all easy to use and all will work on even the most basic of welding machines.

Metals being joined	Electrode	Comments
mild steel	6013	Ideal electrodes for all general purpose work. Features include out standing operator appeal, easy arc starting and low spatter.
mild steel	7014	All positional electrodes for use on mild and galvanized steel furniture, plates, fences, gates, pipes and tanks etc. Especially suitable for vertical-down welding.
cast iron	nickel 99%	Suitable for joining all cast irons except white cast iron.
stainless steel	318L-16	High corrosion resistance. Ideal for dairy work, etc. On stainless steels.
copper, bronze, brass etc.	bronze 5.7ERCUSI-A	Easy to use electrode for marine fittings, water taps and valves, water trough float arms, etc. Also for joining copper to steel and for bronze overlays on steel shafts.
high alloy steels, dissimilar metals, crack resistance, all hard-to-weld jobs	312-16	It will weld most problematical jobs such as springs, shafts, broken joins mild steel to stainless and alloy steels. Not suitable for Aluminum.

Table 13 Types of Electrodes

8.0 MAINTENANCE

If this equipment does not operate properly, stop work immediately and investigate the cause of the malfunction. Maintenance work must be performed by an experienced, qualified person only. Any electrical work must be performed by an electrician or other person properly trained in servicing electrical equipment. Do not permit untrained persons to inspect, clean or repair this equipment. Use only recommended replacement parts when servicing this machine.

Periodically clean the inside of the welding power source by using clean dry compressed air of not over 25psi as normal preventive maintenance. At the time of the cleaning, a full inspection of the welding machine and setup should be performed. Check warning labels on the machine for readability; replace if necessary. Check input and output connections as well as frame ground connections to the machine to insure that they are tight and the wires are not frayed or overheated. Inspect internal wiring of machine for loose or frayed connections; tighten or repair as necessary. It would also be advisable to check connections to wire feeders, fixtures, etc., at this time. Any damaged cable or hoses should be replaced.

DANGER: HIGH VOLTAGE is present internally even with the control power switch in the OFF position. Before inspecting, cleaning, or servicing, disconnect and lock out input power to the power source.

9.0 BASIC TROUBLESHOOTING

WARNING

There are extremely dangerous voltages and power levels present inside this product. Do not attempt to open or repair unless you are an accredited BOSS service agent and you have had training in power measurements and troubleshooting techniques.

If major complex subassemblies are faulty, then the welding power source must be returned to an accredited BOSS service agent for repair.

The basic level of troubleshooting is that which can be performed without special equipment or knowledge.

9.01 Check the item and excrescent phenomenon exclusion method

Troubleshooting Guide

Fault	Cause	Remedy
1. The AC power indicator light is not lit and welding arc can not be established.	1. No power input or main power switches damage. 2. Primary fuse is blown. 3. Indicator damage. 4. Relay PCB damage (for ARC 160VRD). 5. Indicator light is open circuit.	1. Check input power or replace main power switch. 2. Replace primary fuse. 3. Replace indicator light. 4. Replace relay PCB. 5. Replace indicator light.
2. The AC power indicator light on and welding arc can not be established.	1. Input voltage unstable. 2. Diode PCB damage.	1. Connect stabilizer or reset power switch. 2. Replace diode PCB.
3. The warning indicator light on.	1. Over load. 2. MOSFET damage.	1. Reduce current or wait moment. 2. Replace MOSFET.
4. MMA (STICK) mode no circuit output.	1. Function switch select to the MMA mode position. 2. Relay PCB damage. 3. MOSFET damage.	1. Select to MMA mode. 2. Replace relay PCB. 3. Replace MOSFET.
5. MMA (STICK) mode unstable welding arc.	1. Power PCB damage. 2. Diode PCB damage. 3. Control PCB damage.	1. Replace power PCB. 2. Replace diode PCB. 3. Replace control PCB.
6. Fan does not run.	1. Power PCB damage. 2. Fan motor damage. 3. Relay PCB damage.	1. Replace power PCB. 2. Replace fan motor. 3. Replace relay PCB.

Table 14

9.02 TIG welding problems

Weld quality is dependent on the selection of the correct consumables, maintenance of equipment and proper welding technique.

Description	Possible Cause	Remedy
1. Excessive bead build-up or poor penetration or poor fusion at edges of weld.	Welding current is too low.	Increases weld current, and/ or faulty joint preparation.
2. Weld bead too wide and flat or undercut at edges of weld or excessive burn through.	Welding current is too high.	Decreases weld current.
3. Weld bead too small or insufficient penetration or ripples in bead are widely spaced apart.	Travel speed too fast.	Reduce weld speed.
4. Weld bead too wide or excessive bead build up or excessive penetration in butt joint.	Travel speed too low.	Increase travel speed.
5. Uneven leg length in fillet joint.	Wrong placement of filler rod.	Re-position filler rod.
6. Dirty weld pool.	A Electrode contaminated through contact with work piece or filler rod material. B Gas contaminated with air.	A Clean the electrode by grinding off the contaminates. B Check gas lines for cuts and loose fitting or change gas cylinder.
7. Electrode melts or oxidizes when an arc is struck.	A Electrode is connected to the "+" terminal. B No gas flowing to welding region. C Torch is clogged with dust. D Gas hose is cut. E Gas passage contains impurities. F Gas regulator turned off. G Torch valve is turned off. H The electrode is too small for the welding current.	A Connected the electrode to the "-" terminal. B Check the gas lines for kinks or breaks and gas cylinder contents. C Clean torch. D Replace gas hose. E Dismantle a soft tube from the torch then raise gas pressure and blow out impurities. F Turn on. G Turn on. H Increase electrode diameter or reduce the welding current.
8. Poor weld finish.	Inadequate shielding gas.	Increase gas flow or check gas line for gas flow problems.
9. Arc flutters during TIG welding.	A Tungsten electrode is too large for the welding current. B Absence of oxides in the weld pool.	A Select the right size electrode. Refer to basic TIG welding guide. B Refer basic TIG welding guide for ways to reduce arc flutter.
10. Welding arc can not be established.	A Work clamp is not connected to the work piece or the work/ torch leads are not connected to the right welding terminals. B Torch lead is disconnected. C Gas flow incorrectly set, cylinder empty or the torch valve is off.	A Connect the work clamp to the work piece or connect the work/ torch leads to the right welding terminals. B Connect it to the "–" terminal. C Select the right flow rate, change cylinders or turn torch valve on.

11. Arc start is not smooth.	A Tungsten electrode is too large for the welding current. B The wrong electrode is being used for the welding job. C Gas flow rate is too high. D Incorrect shielding gas is being used. E Poor work clamp connection to work piece.	A Select the right size electrode. Refer to basic TIG welding guide. B Select the right electrode type. Refer to basic TIG welding guide C Select the correct rate for the welding job. D Select the right shielding gas. Refer to Basic TIG Welding Guide. E Improve connection to work piece.

Table 15

9.03 Stick welding problems

Description	Cause	Remedy
1 Gas pockets or voids in weld metal (Porosity).	A Electrodes are damp. B Welding current is too large. C Surface impurities such as: oil, grease, paint, etc.	A Dry electrodes before use. B Reduce welding current. C Clean joint before welding.
2 Crack occurring in weld metal soon after solidification commences.	A Rigidity of joint. B Insufficient throat thickness. C Cooling rate is too high.	A Redesign to relieve weld joint of severe stresses or use crack resistance electrodes. B Travel slightly slower to allow greater build up in throat. C Preheat plate and cool slowly.
3 A gap is left by failure of the weld metal to fill the root of the weld.	A Welding current is too low. B Electrode too large for joint. C Insufficient gap. D Incorrect sequence.	A Increase welding current. B Use smaller diameter electrode. C Allow wider gap. D Use correct build-up sequence.
4 Portions of the weld run do not fuse to the surface of the metal or edge of the joint.	A Small electrodes used on heavy cold plate. B Welding current is too low. C Wrong electrode angle. D Travel speed of electrode is too high. E Scale or dirt on joint surface.	A Use larger electrodes and preheat the plate. B Increase welding current. C Adjust angle so the welding is directed more into the base metal. D Reduce travel speed of electrode. E Clean surface before welding.
5 Non-metallic particles are trapped in the weld metal (slag inclusion).	A Non-metallic particles may be trapped in undercut from previous run. B Joint preparation too restricted. C Irregular deposits allow slag to be trapped. D Lack of penetration with slag trapped beneath weld bead. E Rust or mill scale is preventing full fusion. F Wrong electrode for position in which welding is done.	A If bad undercut is present, clean slag out and cover with a run from a smaller diameter electrode. B Allow for adequate penetration and room for cleaning out the slag. C If very bad, chip or grind out irregularities. D Use smaller electrode with sufficient current to give adequate penetration. Use suitable tools to remove all slag from corners. E Clean joint before welding. F Use electrodes designed for position in which welding is done, otherwise proper control of slag is difficult.

Table 16

9.04 Power source problems

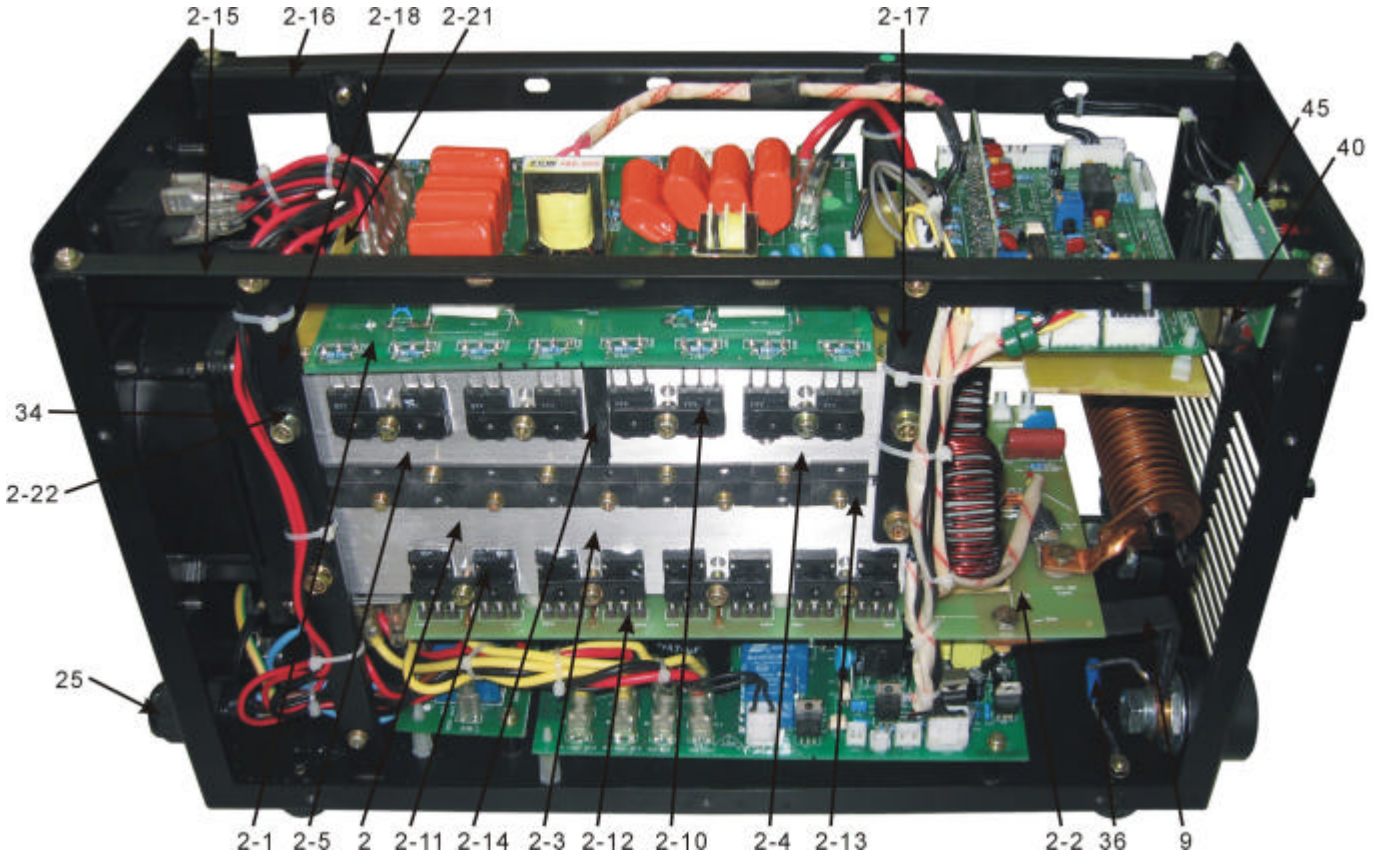
Description	Possible Cause	Remedy
1 The welding arc can not be established.	A The Primary supply voltage has not been switched on. B The welding power source switch is switched off. C Loose connections internally.	A Switch on the primary supply voltage. B Switch on the welding power source. C Have an accredited BOSS service agent repair the connection.
2 Maximum output welding current can not be achieved with nominal Mains supply voltage.	Defective control circuit.	Have an accredited BOSS service agent inspect then repair the welder.
3 Welding current reduces when welding.	Poor work lead connection to the work piece.	Ensure that the work lead has a positive electrical connection to the work piece.
4 No gas flow when the torch trigger switch is depressed.	A Gas hose is cut. B Gas passage contains impurities. C Gas regulator turned off.	A Replace gas hose. B Disconnect gas hose from the rear of power source then raise gas pressure and blow out impurities. C Turn gas regulator on.

Table 17

Notice:

Can move the equipments that the power supply doesn't fixedly mean to link to work with gearing at the some position.

10.0 PART LIST


2-15
2-16
2-18
2-21
2-17
45
40
34
2-22
25
2-1
2-5
2
2-11
2-14
2-3
2-12
2-10
2-4
2-13
2-2
36
9

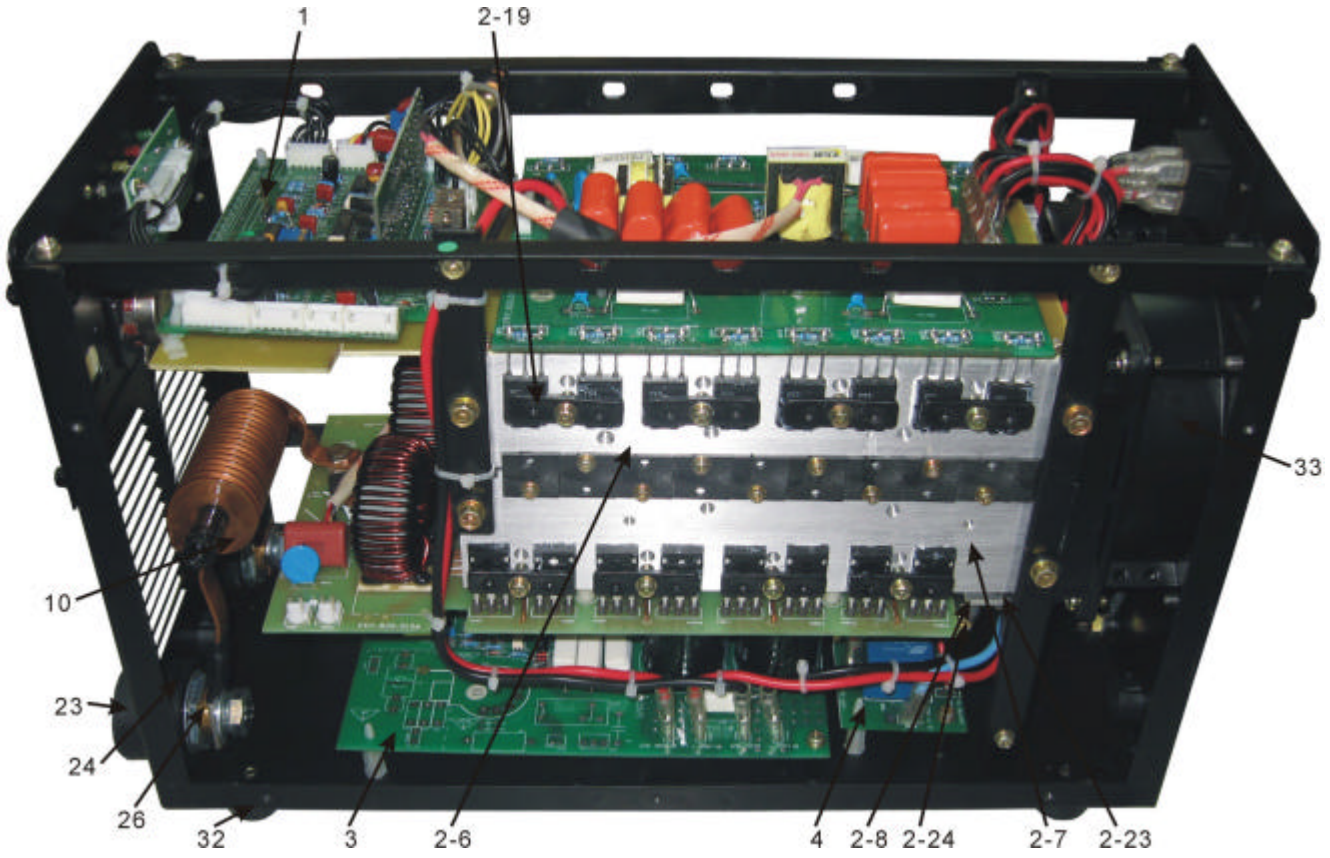

1
2-19
33
10
23
24
26
32
3
2-6
4
2-8
2-24
2-7
2-23

Figure 6

Sequence	Order No	Name	QTY.			
			ARC 140VRD		ARC 160VRD	
			Sensor A	Sensor B	Sensor A	Sensor B
1	3KITP000505020	BOARD,PCB,CONTROL (7.820.514-09)	1		1	
1	3KITP000502002	BOARD,PCB,CONTROL (7.820.514-10)		1		1
2	3KITP000106101	OUTPUT MMA160H			1	
2		OUTPUT MMA160H(SENSOR)				1
2	3KITP000106000	OUTPUT MMA140	1			
2		OUTPUT MMA140 (SENSOR)		1		
2-1	3KITP000506011	BOARD,PCB,MOSFET (7.820.005B)			1	1
2-1	3KITP000106011	BOARD,PCB,MOSFET (7.820.016A)	1	1		
2-2	3KITP000506021	BOARD,PCB,DIODE (7.820.010A-02)			1	
2-2	3KITP000506035	BOARD,PCB,DIODE (7.820.010A-11)				1
2-2	3KITP000106022	BOARD,PCB,DIODE (7.820.017-02)	1			
2-2		BOARD,PCB,DIODE (7.820.017-09)		1		
2-3	2HS7061062	HEATSINK LEFT-LOWER			1	1
2-4	2HS7061063	HEATSINK LEFT-UPPER-A			1	1
2-5	2HS7061064	HEATSINK LEFT-UPPER-B			1	1
2-6	2HS7061060	HEATSINK RIGHT-UPPER			1	1
2-7	2HS7061061	HEATSINK RIGHT-LOWER			1	1
2-3	2HS7061053	HEATSINK LEFT-LOWER	1	1		
2-4	2HS7061054	HEATSINK LEFT-UPPER-A	1	1		
2-5	2HS7061055	HEATSINK LEFT-UPPER-B	1	1		
2-6	2HS7061051	HEATSINK RIGHT-UPPER	1	1		
2-7	2HS7061052	HEATSINK RIGHT-LOWER	1	1		
2-8	2FPPM8610005	BRACKET MOUNTING AL 200			1	1
2-8	2FPPM8610009	BRACKET MOUNTING AL 160	1	1		

2-9	3KITP000106030	THERMOSTAT (Inside)	1	1	1	1
2-10	4VQK2SK2837	MOSFET 2837	12	12	16	16
2-11	4V2HMM20FU020BC812	DIODE ULTRA FAST RECOVERY	12	12	16	16
2-12	4LZQ4X2X5	HOSE FERRITE 4*2*5	36	36	48	48
2-13	2FP8647002	INSULATOR II	16	16	20	20
2-14	2FP8647003	INSULATOR I	1	1	1	1
2-15	2FPBM8610016	BRACKET,HEATSINK MOUNTING			1	1
2-16	2FPBM8610017	BRACKET,HEATSINK MOUNTING			1	1
2-17	2FPBM8610021	BRACKET,HEATSINK MOUNTING I			2	2
2-18	2FPBM8610022	BRACKET,HEATSINK MOUNTING II			2	2
2-15	2FPBM8610000	BRACKET,HEATSINK MOUNTING	1	1		
2-16	2FPBM8610001	BRACKET,HEATSINK MOUNTING	1	1		
2-17	2FPBM8610019	BRACKET,HEATSINK MOUNTING I	2	2		
2-18	2FPBM8610020	BRACKET,HEATSINK MOUNTING II	2	2		
2-19	2FPPP8610117	BRACKET,MOSFET/DIODE (8.610.117)	9	9	16	16
2-20	2FPPP8610118	BRACKET,MOSFET/DIODE (8.610.118)	2	2		
2-21	2FP7840003	INSULATOR,HEATSINK			1	1
2-21	2FP7840002	INSULATOR,HEATSINK	1	1		
2-22	2FP7854011	SPACER,NYLON 凹 D5	8	8	8	8
	4BFTDQ001D5	SPACER,NYLON 凸 D5	8	8	8	8
2-23	2FP7854015	SPACER,NYLON 凹 D4	2	2	2	2
	4BFTDQ003D3BK	SPACER,NYLON 凸 D3	2	2	2	2
2-24	4ABKBPC3510	RECTIFIER	2	2	2	2
3	3KITP000107015	BOARD,PCB,POWER MMA (7.820.002F-01)	1	1	1	1
4	3KITP000509000	BOARD,PCB,RELAY-INPUT (7.820.000A)			1	1
8	3KITP002801010	BOARD,PCB,SENSOR (7.828.019A-02) (Inside)		1		1
9	3BB7725033	BUS BAR,POSITIVE			1	1
9	3BB7725032	BUS BAR,POSITIVE	1	1		
10	3EER10002	COUPLING COIL			1	1
10	3EER10001	COUPLING COIL	1	1		
12	2LAU8803005	LABEL (+ -)65*10	1	1	1	1
13	2LAN8808312	LABEL MANUFACTURERS RATING ARC 160VRD			1	1
13	2LAN8808309	LABEL MANUFACTURERS RATING ARC 140VRD	1	1		
14	2LAM8800003	LABEL GROUND	1	1	1	1
16	2LAM8800001	LABEL VOLTAGE INPUT 240V 1PH	1	1	1	1
17	2FPB6123011	BASE 200=50 FP6.123.011			1	1
17	2FPB6123012	BASE 160=50 FP6.123.012	1	1		
19		BRACKET ON/OFF SWITCH MOUNTING FP8.601.008	1	1	1	1
22	2FP7854025	INSULATOR WASHER (Inside)	4	4	4	4
23	2FP7854004	INSULATOR BULKHEAD FRONT	2	2	2	2
24	2FP7854008	INSULATOR BULKHEAD REAR	2	2	2	2
25	4SXJPG13R5	BUSHING,STRAIN RELIEF PG13.5	1	1	1	1
26	2GS50CC001FP	RECEPTACLE,TWIST LOCK(FEMALE) POWER	2	2	2	2
27	4KCD221BK	SWITCH	1	1	1	1
28	4KYZPN8D24	KNOB	1	1	1	1

30	4FANCA1238	FAN COVER	1	1	1	1
31	2FP8647000-1	CAP PROTECTION (Inside)	2	2	2	2
32	4JFT20X27	MOUNT NPRN JJ30	4	4	4	4
33	4FAN001SA1238	FAN	1	1	1	1
34	2PST8634001	INSULATOR FAN	1	1	1	1
36	481CC2KV103	CAPACITOR 3KV103	1	1	1	1
38	4V2FDLEDD5GN	LED GN	2	2	2	2
	4V2FDLEDS01D5	LED BASE	2	2	2	2
39	4V2FDLEDD5RDGN	LED RD/GN	2	2	2	2
	4V2FDLEDD5X7	LED BASE	2	2	2	2
40	4WTH1A2W1K	POTENTIONMETER 2W 1K	1	1	1	1
44	2FPPC8041109	PANEL CONTROL ARC 140VRD FP8.041.109	1	1		
44	2FPPC8041124	PANEL CONTROL ARC 160VRD FP8.041.124			1	1
45	3KITP002406018	BOARD,PCB,VRD (7.825.018)	1	1	1	1
46	2LAC8807272	OVERLAY CONTROL ARC 140VRD	1	1		
46	2LAC8807273	OVERLAY CONTROL ARC 160VRD			1	1
47	2FPPT8040001Y	PANEL TOP FP8.040.001Y			1	1
47	2FPPT8040000Y	PANEL TOP FP8.040.000Y	1	1		
48	4HDL00001	HANDLE	1	1	1	1
49	2LAW8805000	LABEL WARNING	1	1	1	1
50	2LAS8809040	LABEL BOSS	2	2	2	2

Table 18

11.0 Remark

11.1 Welding machines rear panels meet the plume to have good to turn on the earth grounding, by guarantees the welder safety. When welder operation, should wear protects the mirror, the glove, puts on protects the clothing.

11.2 When the electrical network voltage is higher than 240V/260V, the out-put will appear the class, the overload, the welding machine automatically has stopped outputting and giving the red candle demonstration warning.

11.3 Ambient temperatures high when big electric current long time continuous working, the welding machine has stopped because of the heat outputting, gets down until the temperature drop only then restores.

11.4 When welding machines do not use temporarily, its depository should maintain dryly, cleanly. The environment relative humidity is not bigger than 85%.

11.5 Storing ambient temperature is -25℃~ +55℃.

11.6 When long-time does not use, every two months should electrify a time, a humidity month of every two week should electrify use a time, by use own thermal row of tide.